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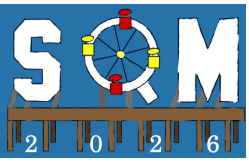


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# Self-energy corrections for quantum kinetic theory and spin polarization

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Quantum kinetic theory (QKT) of relativistic fermions is one of useful theoretical frameworks to track non-equilibrium evolution of spin transport albeit in weakly coupled systems. Except for the quantum corrections, characterized by the gradient expansion in phase space, from the imaginary part of (retarded and advanced) self-energies responsible for the spin-orbit interaction in collisions, we derive the QKT with also the real part of the self-energies modifying the on-shell condition. The quantum correction, especially given by the gradient of vector self-energy, plays a similar role to the background electromagnetic fields, which can accordingly generate spin polarization. We further discuss how such self-energy corrections lead to the radiative correction upon vortical spin polarization in thermal equilibrium. Moreover, we introduce a more systematic and general approach through the Keldysh equation from Wigner functions to analyze the radiative corrections in hot QCD matter. By applying the hard-thermal-loop approximation, we obtain new corrections upon the spin-polarization spectrum and also the axial-charge current in connection to the axial/chiral vortical effect for massive quarks up to the leading order of the QCD coupling.

**Authors:** YANG, Di-Lun (Institute of Physics, Academia Sinica); PU, Shi (University of Science and Technology of China); FANG, Shuo (University of Science and Technology of China)

**Presenter:** YANG, Di-Lun (Institute of Physics, Academia Sinica)

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